

## IRRIGATION SYSTEM SPRINKLER PERMANENT/SOLID-SET DESIGN DATA SHEET

Cooperator: \_\_\_\_\_ Job No.: \_\_\_\_ Date: \_\_\_\_\_ Sheet \_\_\_\_ of \_\_\_\_

Location: \_\_\_\_\_

Conservation District: \_\_\_\_\_ Field Office: \_\_\_\_\_ Field No.: \_\_\_\_\_

Identification No.: \_\_\_\_\_

1. Design area: \_\_\_\_\_ acres

Description of soils \_\_\_\_\_

Soil Series:		Soil Series:		Soil Series:	
Soil Depth (in.)	Average AWC (in./in.)	Soil Depth (in.)	Average AWC (in./in.)	Soil Depth (in.)	Average AWC (in./in.)

Design Soil Series: \_\_\_\_\_

2. Crops:

<u>Crop</u>	<u>Acres</u>	<u>Planting Date</u>	<u>Maturity Date</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Total acres		_____	_____

3. Water Supply:

Source of supply: (stream, well, reservoir, etc.) \_\_\_\_\_

Reservoir: Storage \_\_\_\_\_ ac-ft Available for Irrigation \_\_\_\_\_ ac-ft

Well: Static Water Level \_\_\_\_\_ ft  
Measured Capacity \_\_\_\_\_ gpm @ \_\_\_\_\_ ft drawdown  
Design Pumping Lift \_\_\_\_\_ ft

Stream: Measured flow (season of peak use) \_\_\_\_\_ gpm

Quality of water (Evidence of suitability. Area of known water quality or water analysis attached). \_\_\_\_\_

Distance of water supply source to field \_\_\_\_\_ feet

4. Type of power unit and pump to be used: \_\_\_\_\_

\_\_\_\_\_

5. Map of design area - Scale 1" = \_\_\_\_\_ feet. Sketch map on grid or attach photo or overlay.

This image shows a full page of dot grid paper. A solid black vertical line runs down the left side, creating a margin. The rest of the page is covered by a regular grid of small black dots, spaced evenly both horizontally and vertically. There are no markings or text on the page other than the grid itself.

- a. Source of water
- b. Elevation differences
- c. Row direction
- d. Solid set layout
- e. Plan of Operations
- f. Field Obstructions  
(canals, trees, fences  
buildings, etc.)
- g. North arrow

[illegible]

Cooperator: \_\_\_\_\_ Job No.: \_\_\_\_\_ Date: \_\_\_\_\_ Sheet \_\_\_\_ of \_\_\_\_

IRRIGATION UNIT NUMBER					
6. Crop Information	1	2	3	4	5
Kind of Crop					
Acreage to be grown (acres) <sup>1/</sup>					
Rooting depth (in.)					
Peak use rate (in./day)					
7. Soil Information					
Weighted AWC for rooting depth (in./in.)					
Basic intake rate (in./hr.)					
8. Design Procedure					
AWC within root zone (in.)					
% Depletion allowed prior to irrigation					
Net water applied per irrigation (in.)					
Water application efficiency (%)					
Gross water applied per irrigation (in.) <sup>1/</sup>					
Irrigation interval (days)					
Irrigation period (days per irrigation) <sup>1/</sup>					
Hours operating per day <sup>1/</sup>					
Q <sub>R</sub> = Quantity of water required (gpm) <sup>1/</sup>					
9. Irrigation Unit Design					
Application Rate (in./hr) <sup>2/</sup>					
Time per lateral or unit set <sup>3/</sup>					
Number of sprinklers per unit					
Q <sub>A</sub> <sup>4/</sup> = Quantity of water actual (gpm/unit)					

10. Sprinkler Specifications:

- a. Sprinkler spacing \_\_\_\_\_ ft. Lateral spacing \_\_\_\_\_ ft.  
b. Nozzle size \_\_\_\_\_ x \_\_\_\_\_ wetted diameter \_\_\_\_\_ ft.  
c. Capacity \_\_\_\_\_ gpm @ \_\_\_\_\_ psi or \_\_\_\_\_ ft of head.

$$^{1/} Q_R = \frac{453 \times \text{acres} \times \text{in. gross application}}{\text{hrs. opr. per day} \times \text{days per irrigation}} = \text{_____ gpm}$$

$$^{2/} \text{Application rate (in./hr.)} = \frac{\text{gpm/spk} \times 96.3}{S \times L} \quad (\text{MUST BE} \leq \text{BASIC INTAKE RATE})$$

Where S = Spacing of sprinklers along lateral in feet.  
L = Spacing between laterals in feet.

$$^{3/} \text{Time per lateral or unit set} = \frac{\text{Gross water applied per irrigation (in.)}}{\text{Application Rate (in./hr.)}}$$

$$^{4/} Q_A = \text{maximum unit gpm} = \text{gpm/spk} \times \text{number of sprinklers per unit, Must} \geq Q_R$$

Cooperator: \_\_\_\_\_ Job No.: \_\_\_\_ Date: \_\_\_\_\_ Sheet \_\_\_\_ of \_\_\_\_

11. Determining Total Dynamic Head <sup>5/</sup>

Kind of Pipe			Design Capacity (gpm)	IPS: <input type="checkbox"/> PIP: <input type="checkbox"/> Other ____ Diameter (in.)	Length (ft)	Friction Head Loss (ft/100ft)	Total Head Loss HL (ft)	Total Head Loss, HL	
Main	Mani-Fold	Lateral						(ft)	(psi)
xxxx								xxxx	xxxx
xxxx								xxxx	xxxx
xxxx								xxxx	xxxx
xxxx								xxxx	xxxx
xxxx								xxxx	xxxx
<sup>6/</sup> Sum HL _____ x 0.5=									
	xxxx	xxxx					xxxx		
	xxxx	xxxx					xxxx		
	xxxx	xxxx					xxxx		
	xxxx	xxxx					xxxx		
	xxxx	xxxx					xxxx		
Design Sprinkler Nozzle Pressure									
Miscellaneous Losses									
Riser Height									
Pump Discharge Pressure									
Pumping Lift									
Total Dynamic Head, TDH									

12. Pump Requirements: \_\_\_\_\_ gpm @ \_\_\_\_\_ psi or \_\_\_\_\_ ft of head ☐ TDH  
☐ Pump Discharge Pressure

13. Check allowable pressure variation that will provide a 20% or less total variation of the design sprinkler discharge

Allowable pressure variation = \_\_\_\_\_ psi to \_\_\_\_\_ psi = \_\_\_\_\_ psi variation  
Actual <sup>7/</sup> pressure variation = \_\_\_\_\_ psi to \_\_\_\_\_ psi = \_\_\_\_\_ psi variation

14. Remarks \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

<sup>5/</sup> Use pipe sizing sheets where elevation differences are present and/or additional data lines needed.

<sup>6/</sup> Sets optimum emitter pressure at a theoretical mid-system sprinkler.

<sup>7/</sup> Consider elevations and location. Adjust <sup>6/</sup> if possible to stay within allowed variation. If not, the system must be redesigned.

Designed By: _____	Date _____
Checked By: _____	Date _____
Approved By: _____	Date _____